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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/579,466 | 05/26/2000 | Koichi Sato | P19105 | 7486 |
| 7055 | 7590 | 08/09/2004 | EXAMINER GENCO, BRIAN C | |
| GREENBLUM & BERNSTEIN, P.L.C. 1950 ROLAND CLARKE PLACE RESTON, VA 20191 | | | ART UNIT 2615 | |
| | | | PAPER NUMBER | |
| | | | DATE MAILED: 08/09/2004 | |

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/579,466

Applicant(s)

SATO, KOICHI

Examiner

Brian C Genco

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: ____.

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Applicant's amendment filed June 1, 2004 has been fully considered by the Examiner but is not deemed persuasive.

Applicant argues that Examiner is using impermissible hindsight to reject the claims and further that Hynecek does not disclose the relationships $E(t,T)$ and $N(t,T)$ advanced by the Examiner.

In response to applicant's argument that the Examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the Applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

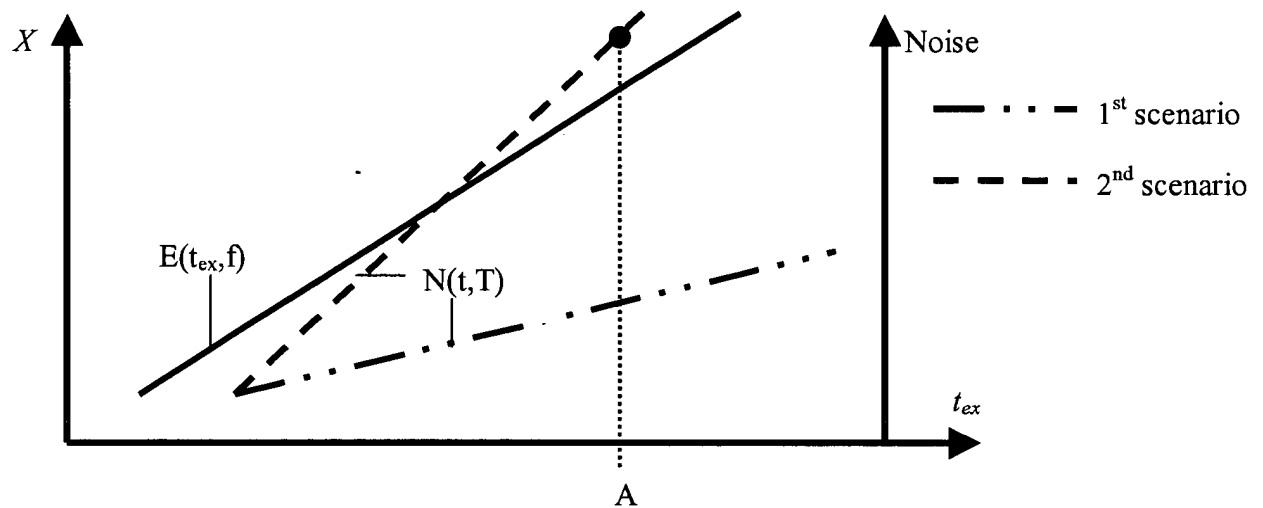
That said, Examiner notes that equation 8 of Hynecek, namely:

$$X = t_{ex} * f_g * (dN_{bp}/dN_{abp})$$

wherein, X indicates the number of full well exposures that can be handled, namely the amount of excess charge, or noise, that can be eliminated, t_{ex} indicates the exposure time, f_g indicates the frequency of clocking the charge pumping operation, and dN_{bp}/dN_{abp} indicates the amount of charge eliminated by the charge pumping operation for each switching operation. Examiner notes that dN_{bp}/dN_{abp} is a constant based on physical characteristics of the device; see Fig. 10. As such, the function $E(t,f)$ is clearly disclosed by Hynecek.

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Examiner notes that AAPA discloses on page 2, lines 6-14 that as the temperature increases, the amount of noise increases and further that as the accumulating period increases, the amount of noise increases. Examiner concedes that no further details are given as to the rate of increase in noise as exposure time increases, however, one skilled in the art would clearly recognize that two scenario's are possible as illustrated bellow.



Examiner notes that in the above illustration the solid line represents X as a function of the exposure time as disclosed by Hynecek in equation 8. Examiner notes that this line has a slope of $f_g \cdot dN_{bp} / dN_{abp}$ for a given gate clocking frequency. The rate of increase in noise generated by having a longer exposure period as disclosed by AAPA is illustrated by the two dashed lines above with respect to the noise axis. In the first scenario, the rate of increase in noise as the exposure period increases is less than or equal to $f_g \cdot dN_{bp} / dN_{abp}$, in which case the current gate clocking frequency is sufficient to eliminate the noise. However, in the second scenario, the rate of increase in noise as the exposure period increases is greater than $f_g \cdot dN_{bp} / dN_{abp}$. In this case, Examiner notes that the only other variable that can be changed is the gate clocking frequency. As such, when the line of

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the second scenario crosses the line of X , the gate clocking frequency must be increased so as to handle the increased noise as would clearly be recognized by one skilled in the art. In other words, in the second scenario, given the exposure time for a current frame is set to A as illustrated above, the amount of noise generated is greater than the amount of noise that can be eliminated. In looking at Hynecek's equation given a fixed exposure time A for a current frame, noise increases, or the amount of noise needed to be eliminated, X , is increased. The only variable that can be adjusted to compensate for this increased noise is the gate clocking frequency. Examiner notes that it is extremely well known to calculate an exposure period for a current frame in order to enable proper exposure as is taught by Tani.

Examiner notes that the arguments made above apply to any situation in which the amount of noise generated is greater than a the amount of noise that can be eliminated.

As such, Examiner asserts that the grounds of rejection previously presented for claim 7 in Paper No. are correct and no improper hindsight is utilized, merely an extrapolation of Hynecek's equation using common mathematical concepts that one skilled in the art would clearly have and the explicit teachings of AAPA and Tani.

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Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-5 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over (USPN 4,679,212 to Hyncek) in view of (USPN 5,339,162 to Tani) in further view of (Applicants Admitted Prior Art, herein AAPA).

In regards to claim 1 Hyncek discloses an apparatus for driving an imaging device, comprising:

a light receiving element provided with first and second electrodes (e.g., Fig. 17 wherein element 84 of Fig. 17 is the first electrode and element 88 of Fig. 17 is the second electrode); and

a voltage control processor that controls voltage levels of said first and second electrodes during said accumulating period (e.g., the voltage control processor is implicit in the description on column 14, lines 43-54);

said voltage control processor fixing a voltage level of said first electrode and periodically changing a voltage of said second electrode, in accordance with a length of said accumulating period, so that a charge pumping operation is performed (e.g., as disclosed on column 12, lines 12-42, the switching of said second electrode is done in accordance with a length of said accumulating period, namely that the number of times the switching occurs is limited for a given switching frequency based on the accumulating period).

Hyncek does not explicitly disclose nor preclude an accumulating period calculating processor that obtains an accumulating period of an imaging device.

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Examiner notes that in equation 8 disclosed on column 12, line 20, the exposure time, or accumulating period, is a variable in determining the overload capacity of the imaging device. Examiner further notes that it is extremely well known to perform photometry to determine ambient lighting conditions so as to enable proper setting of an accumulation period for generating a properly exposed image as taught by Tani in column 1, lines 49-54 and as is generally known to one skilled in the art at the time of the invention.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have added a photometry and control device to Hynecek's invention in order to determine ambient lighting conditions so as to enable proper setting of an accumulation period for generating a properly exposed image.

In regards to the limitation of said voltage control processor shortening a period by which said voltage level of said electrode is periodically changed as said accumulating period increases, Examiner refers Applicant to Fig. 10 and equation 8. Examiner notes that as disclosed in equation 8, as the exposure time increases the number of full well exposures that can be handled increases. Examiner is defining this relationship as the function $E(t,f)$, wherein E is the number of full well exposures that can be handled, t is the accumulation period, and f is the clocking frequency of the second electrode.

Examiner further notes that AAPA disclosed on page 2, lines 6-14 that as the temperature or accumulating period increase the amount of noise increases. Examiner is defining this relationship as the function $N(t,T)$ wherein N is the amount of noise, t is the accumulating period, and T is the temperature. Examiner notes that one skilled in the art at the time of the invention would clearly recognize that upon the function $N(t,T)$ exceeding the function $E(t,f)$ blooming would occur. Due to the direct correlation between the number

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of full well exposures that can be handled and the clocking frequency of the second electrode illustrated in equation 8, as the number of full well exposures increase the clocking frequency must be increased so as to handle the increased number of full well exposures. As such, based on the relationship shown in Fig. 10 and equation 8 one of ordinary skill in the art would recognize to increase the clocking frequency of the second electrode in order to offset the increased noise.

Examiner notes that since the noise function is dependent on temperature as noted above the same logic could be applied to reject claims 6 and 8 as well, however, in the interest of simplicity this additional rejection will be omitted for now.

In regards to claims 2 and 3 see Fig. 17 and column 5, lines 7-12.

In regards to claim 4 see Examiners notes on the rejection of claim 1. Note that in Fig. 17 the second electrode is toggled.

In regards to claim 5 see Examiners notes on the rejection of claim 1. Note that the Examiner is defining the standard period as the period from the start of the accumulation period to the first switch of said second electrode.

In regards to claims 9-11 see Examiners notes on the rejections above.

Claims 6, 8, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over (USPN 4,679,212 to Hynecek) in view of (USPN 5,339,162 to Tani) in further view of (Applicants Admitted Prior Art, herein AAPA) in further view of (USPN 4,703,442 to Levine).

In regards to claim 6 Examiner notes column 12, lines 12-42. Examiner notes that equation 8 discloses that in a given exposure time period a constant number of full well

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exposures can be handled at a given second electrode clocking frequency (note Fig. 10; column 9, line 30 – column 10, line 13). Examiner notes that as shown in Fig. 10 the higher the clocking frequency of the second electrode the more full well exposures can be handled. Examiner further notes Fig. 11 and column 10, lines 14-66 wherein it is disclosed that as the temperature increases the number of full well exposures that can be handled decreases. Examiner notes that Hynecek does not explicitly disclose that there is a temperature sensor. Examiner notes that Levine discloses using a temperature sensor for allowing proper correction of dark current in accordance with the temperature (column 2, lines 24-34; column 5, lines 32-37; element 40 of Fig. 1). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have added a temperature sensor to Hynecek's invention in order to allow for proper correction of dark current in accordance with the temperature. Examiner further notes that one skilled in the art would clearly recognize that given the relationships disclosed by Hynecek, in order to handle the same number of full well exposures as the temperatures increases one of ordinary skill in the art at the time of the invention would clearly know to increase the clocking frequency of the second electrode. As such, the standard period as defined above is changed in accordance with the temperature, namely it is decreased as the temperature is increased.

In regards to claim 8 see Examiners notes on the rejection of claim 6. Note that as described in the rejection of claim 6 the period of switching the level of the second electrode is changed in accordance with the temperature, namely decreasing the period for increased temperature.

In regards to claim 12 see Examiner's notes on the rejections above.

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Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian C. Genco who can be reached by phone at 703-305-7881 or by fax at 703-746-8325. The examiner can normally be reached on Monday thru Friday 8:30am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Christensen can be reached on 703-308-9644. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

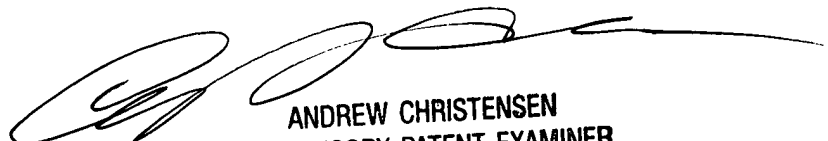
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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the customer service office whose telephone number is 703-308-4357.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Brian C Genco
Examiner
Art Unit 2615

July 6, 2004



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